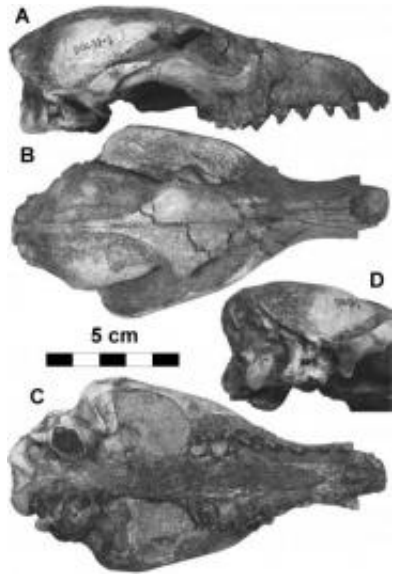
Nearly 100 new species described by California Academy of Sciences in 2009

December 14 2009



California Academy of Sciences curator Zeray Alemseged and his colleagues described this new (extinct) species of raccoon dog (*Nyctereutes lockwoodi*) from the fossil record in Ethiopia. Academy scientsts described 93 other new species in 2009. Credit: California Academy of Sciences

In 2009, researchers at the California Academy of Sciences added 94 new relatives to our family tree. The new species include 65 arthropods, 14 plants, eight fishes, five sea slugs, one coral, and one fossil mammal. They were described by two dozen Academy scientists along with several dozen international collaborators.

Proving that there are still plenty of places to explore and things to discover on Earth, the scientists made their finds over four continents and two oceans, climbed to the tops of mountains and descended to the bottom of the sea, looked in their owns backyards (Yosemite National Park) and on the other side of the world (Yunnan Province, China). Their results, published in 29 different scientific papers, add to the record of life on Earth and will inform future studies on biodiversity, evolution, and conservation.

"Humans rely on healthy ecosystems, made up of organisms and their environments," says Dr. David Mindell, Dean of Science and Research Collections at the Academy. "Creating a comprehensive inventory of life on our planet is critical for understanding and managing resources. Yet a great many life-forms remain to be discovered and described. The effort to determine the genealogical links among all life-forms, and describe their distributions, allows biologists to assess the relative distinctiveness of groups of organisms and various geographic regions, and helps determine conservation priorities."

One recent example of a comprehensive species inventory informing conservation priorities appeared in the April 11, 2008 issue of *Science*. Academy curator Brian Fisher and his colleagues proposed sites for new protected areas on Madagascar, using distribution data amassed over ten years from 2,315 species of ants, butterflies, frogs, geckos, lemurs, and plants. The study was intended to help the government of Madagascar, which is in the midst of increasing its protected-area network from 5 million to 15 million acres. The team's recommendation, which preserves all 2,315 species in the study, provides a model for making conservation decisions in other biodiversity hotspots around the world.

Below are a few highlights among the 94 species described by Academy scientists this year. For a full list of species, including geographic information, visit

www.calacademy.org/newsroom/releases/2009/new_species_list.php.

Denizens of the Deep

The deep sea is often described as Earth's last frontier, so it is not surprising that several new species on the list were collected in the cold, dark depths of the ocean via submersible, Remote Operated Vehicles, and deep-sea trawls. These include three grenadier fishes (*Coelorinchus fuscigulus, C. obscuratus,* and *C. osipullus*); two Bellottia fishes (*B. cryptica* and *B. robusta*); the enigmatic black "ghostshark," which has sexual appendages on its forehead (*Hydrolagus melanophasma*); and a deep-sea coral (*Gersemia juliepackardae*) named after Julie Packard, for her dedication to ocean stewardship and conservation.

California Academy of Sciences curator Terry Gosliner described this new species of nudibranch, *Phyllodesmium karenae,* from the Philippines in 2009. Academy scientists desribed 93 other new species in 2009. Credit: Terry Gosliner, California Academy of Sciences.

Threatened by Climate Change

Even a small insect can tell the story of global climate change. Academy

curator Dave Kavanaugh and graduate student Sean Schoville discovered the ice beetle Nebria praedicta on a single peak in California's Trinity Alps. The beetle lives only in the presence of glaciers and snowfields, which are melting under current warming trends. In the paper, the authors write: "The disappearance of these temperature moderating bodies, which is virtually certain to occur with the current climatic warming trend, would be catastrophic for this species…and likely lead to their quick extinction."

Spiders from Yunnan, China

Arthropods (insects, arachnids, and their relatives) are the most diverse group of animals on Earth. Accordingly, over two-thirds of the new species on the Academy's list are arthropods. A paper by Academy research associate Jeremy Miller, curator Charles Griswold, and collaborator Chang Min Yin describes 36 new spider species, all from Yunnan Province, China. This paper is the latest result from an ongoing, ten-year inventory of this biodiversity hotspot, led by Academy and Chinese scientists. Griswold co-authored two additional papers in 2009 describing spiders from Yunnan (*Mallinela bifurcata, M. biumbonalia, M. kunmingensis,* and *Sanmenia tengchong*).

California Hotspot

Besides hosting a diverse population of people, California is also home to one of the most diverse collections of plant and animal species on the planet. This rich diversity has earned California a title as one of the world's 34 biodiversity hotspots. Ten species on this year's list were collected in or just off the shore of California (though not necessarily endemic to the state): the aforementioned black ghostshark (*Hydrolagus melanophasma*), deep-sea coral (*Gersemia juliepackardae*), and ice beetle (*Nebria praedicta*); four mite species that live parasitically in the feathers

of birds (*Syringophiloidus sialius, Torotrogla coccothraustes, T. cyanocitta,* and *T. piranga*); two mosses from Yosemite National Park (*Homalothecium californicum* and *Pseudoleskea tribulosa*); and a lacewing (*Ceraeochrysa chiricahuae*) found all over the United States.

Fossil Raccoon Dog

Ten years ago, anthropology curator Zeray Alemseged initiated the Dikika Research Project to explore the fossil-rich Awash Valley in Ethiopia. While the project has yielded several important discoveries related to early human evolution (including an infant Australopithecus afarensis fossil, dubbed "the world's oldest child" in 2006), the non-human discoveries provide equally important information about the valley's ancient environment. This year, Alemseged and his colleagues report the only new mammal species on the Academy's list: a raccoon dog (*Nyctereutes lockwood*i) from 3.3 million years ago. Described from a nearly complete skull and fragments of others, this small, omnivorous mammal is a member of the canid family, which includes dogs, wolves, and foxes. Fossil raccoon dogs have been uncovered throughout Asia, Europe, and Africa, but only one species remains today (*N. procyonoides,* native to East Asia). This extant species gets its common name from its raccoon-like coloring but is not closely related to raccoons—its closest living relatives are thought to be foxes. It forms monogamous pair bonds and is the only member of the dog family to hibernate in the winter.

Source: California Academy of Sciences